

# Offset printing

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**Offset printing** is a widely used printing technique where the inked image is transferred (or "offset") from a plate to a rubber blanket, then to the printing surface. When used in combination with the lithographic process, which is based on the repulsion of oil and water, the offset technique employs a flat (planographic) image carrier on which the image to be printed obtains ink from ink rollers, while the non-printing area attracts a film of water, keeping the non-printing areas ink-free.

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This article is part of the series on the

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#### Technologies

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Woodblock printing	200 CE
Movable type	1050
Intaglio	1430s
Printing press	1439
Lithography	1796
<b>Offset press</b>	by 1800s
Chromolithography	1837
Rotary press	1843
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Screen-printing	1907
Dye-sublimation	1957
Photocopier	1960s
Laser printer	1969
Dot matrix printer	1970
Thermal printer	
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## Offset printing advantages

Advantages of offset printing compared to other printing methods include:

- Consistent high image quality. Offset printing produces sharper and cleaner images and type than letterpress printing because the rubber blanket conforms to the texture of the printing surface.
- Quick and easy production of printing plates.
- Longer printing plate life than on direct litho presses because there is no direct contact between the plate and the printing surface.

## Photo offset

The most common kind of offset printing is derived from the **photo offset** process, which involves using light-sensitive chemicals and photographic techniques to transfer images and type from original materials to printing plates.

In current use, original materials may be an actual photographic print and typeset text. However, it is more common — with the prevalence of computers and digital images — that the source material exists only as data in a digital publishing system.

Offset litho printing on to a web (reel) of paper is commonly used for printing of newspapers and magazines for high speed production.

## Sheet-fed litho

Offset litho printing on to single sheets of paper or board. Commonly used for printing of short run magazines, brochures, letter headings, general commercial (jobbing) printing.

## Present day

Offset printing is the most common form of high-volume commercial printing, due to advantages in quality and efficiency in high-volume jobs. While modern digital presses (Xerox iGen3 Digital Production Press, for example) are getting closer to the cost/benefit of offset for high-quality work, they



have not yet been able to compete with the sheer volume of product that an offset press can produce. Furthermore, many modern offset presses are using computer to plate systems as opposed to the older computer to film workflows, which further increases their quality.

MAN Roland press

In the last two decades, flexography has become the dominant form of printing in packaging due to lower quality expectations and the significantly lower costs in comparison to other forms of printing.

## References

- "Offset Printing". *Encyclopædia Britannica*. Retrieved March 22, 2004, from Encyclopædia Britannica Premium Service.<sup>[1]</sup> (<http://www.britannica.com/eb/article?eu=58234>)
- History of Lithography ([http://www.ipaper.com/PDF/PDFs\\_for\\_Papers/History%20of%20Lithography.pdf](http://www.ipaper.com/PDF/PDFs_for_Papers/History%20of%20Lithography.pdf)). *International Paper*.
- HistoryWired: Rubel Offset Lithographic Press (<http://historywired.si.edu/object.cfm?ID=395>). *Smithsonian National Museum of American History*.

## External links

- Heidelberger Druckmaschinen AG (<http://www.heidelberg.com/>)
- How Offset Printing Works (<http://www.howstuffworks.com/offset-printing.htm>)
- printing services (<http://www.newlitho.com.au/>)

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# Screen-printing

From Wikipedia, the free encyclopedia  
(Redirected from Silkscreen printing)

**Screenprinting**, **silkscreening**, or **serigraphy** is a printmaking technique that creates a sharp-edged image using a stencil. A **screenprint** or **serigraph** is an image created using this technique.

It began as an industrial technology, and was adopted by American graphic artists in the early 1900s. It is currently popular both in fine arts and in commercial printing, where it is commonly used to print images on T-shirts, hats, CDs, DVDs, ceramics, glass, polyethylene, polypropylene, paper, metals, and wood. The Printer's National Environmental Assistance Center says "Screen printing is arguably the most versatile of all

printing processes."<sup>[1]</sup> Since rudimentary screen-printing materials are so affordable and readily available, it has been used frequently in underground settings and subcultures, and the non-professional look of such DIY culture screen prints has become a significant cultural aesthetic seen on movie posters, record album covers, flyers, shirts, commercial fonts in advertising, and elsewhere.

Graphic screenprinting is widely used today to create many mass or large

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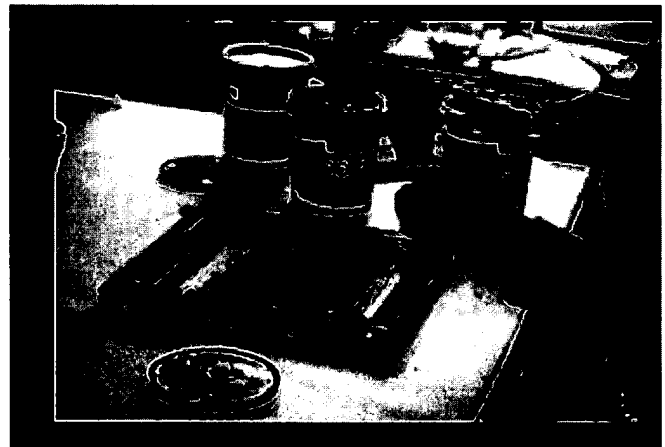
batch produced graphics, such as posters or display stands. Full color prints can be created by printing in CMYK (cyan, magenta, yellow and black). Screenprinting is often preferred over other processes such as dye sublimation or inkjet printing because of its low cost and ability to print on many types of media.

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## Printing technique

A screen is made of a piece of porous, finely woven fabric (originally silk, but typically made of polyester since the 1940s) stretched over a frame of aluminum or wood. Areas of the screen are blocked off with a non-permeable material to form a stencil, which is a positive of the image to be printed; that is, the open spaces are where the ink will appear.



The screen is placed atop a substrate such as papyrus or fabric. Ink is placed on top of the screen, and a fill bar (also known as a floodbar) is used to fill the mesh openings with ink. The operator begins with the fill bar at the rear of the screen and behind a reservoir of ink. The operator lifts the screen to prevent contact with the substrate and then using a slight amount of downward force pulls the fill bar to the front of the screen. This effectively fills the mesh openings with ink and moves the ink reservoir to the front of the screen. The

operator then uses a squeegee (rubber blade) to move the mesh down to the substrate and pushes the squeegee to the rear of the screen. The ink that is in the mesh opening is transferred by capillary action to the substrate in a controlled and prescribed amount, i.e. the wet ink deposit is equal to the thickness of the stencil. As the squeegee moves toward the rear of the screen the tension of the mesh pulls the mesh up away from the substrate leaving the ink upon the substrate surface.

There are three types of screen printing presses. The 'flat-bed' (probably the most widely used), 'cylinder', and 'rotary'.<sup>[1]</sup>

Textile items are printed in multi-color designs using a wet on wet technique, while graphic items are allowed to dry between colors that are then printed with another screen and often in a different color.

The screen can be re-used after cleaning. However if the design is no longer needed, then the screen can be "reclaimed", that is cleared of all emulsion and used again. The reclaiming process involves removing the ink from the screen then spraying on stencil remover to remove all emulsion. Stencil removers come in the form of liquids, gels, or powders. The powdered types have to be mixed with water before use, and so can be considered to belong to the liquid category. After applying the stencil remover the emulsion must be washed out using a pressure washer.

Most screens are ready for recoating at this stage, but sometimes screens will have to undergo a further step in the reclaiming process called dehazing. This additional step removes haze or "ghost images" left behind in the screen once the emulsion has been removed. Ghost images tend to faintly outline the open areas of previous stencils, hence the name. They are the result of ink residue trapped in the mesh, often in the knuckles of the mesh, those points where threads overlap.<sup>[2]</sup>

While the public thinks of garments in conjunction with screen printing, the technique is used on tens of thousands of items, decals, clock and watch faces, and many more products. The technique has even been adapted for more advanced uses, such as laying down conductors and resistors in multi-layer

exposed to light dissolve and wash away, leaving a negative stencil of the image on the mesh.

Photographic screens can reproduce images with a high level of detail, and can be reused for tens of thousands of copies. The ease of producing transparent overlays from any black-and-white image makes this the most convenient method for artists who are not familiar with other printmaking techniques. Artists can obtain screens, frames, emulsion, and lights separately; there are also preassembled kits, which are especially popular for printing small items such as greeting cards.

Another advantage of screen printing is that large quantities can be produced rapidly with new automatic presses. (about 800 shirts in 1 hour)

## Screen print methods

### Plastisol

the most common plastisol based helloprint used in garment decoration. Good colour opacity onto dark garments and clear graphic detail with, as the name suggests, a more plasticized texture. This print can be made softer with special additives or heavier by adding extra layers of ink.

### Water Based inks

these penetrate the fabric more than the plastisol inks and create a much softer feel. Ideal for printing darker inks onto lighter coloured garments. Also useful for larger area prints where texture is important.

### PVC/ Phalate Free

relatively new breed of ink and printing with the benefits of plastisol but without the two main toxic components - soft feeling print.

### Discharge inks

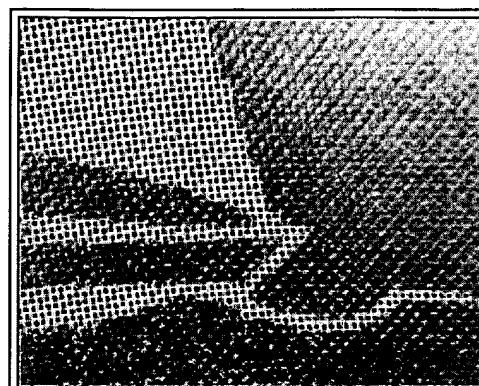
used to print lighter colours onto dark background fabrics, they work by removing the dye in the garment – this means they leave a much softer texture. They are less graphic in nature than plastisol inks, and exact colours are difficult to control, but especially good for distressed and vintage prints.



circuits using thin ceramic layers as the substrate.

## Stenciling techniques

There are several ways to create a stencil for screenprinting. An early method was to create it by hand in the desired shape, either by cutting the design from a non-porous material and attaching it to the bottom of the screen, or by painting a negative image directly on the screen with a filler material which became impermeable when it dried. For a more painterly technique, the artist would choose to paint the image with drawing fluid, wait for the image to dry, and then coat the entire screen with screen filler. After the filler had dried, water was used to spray out the screen, and only the areas that were painted by the drawing fluid would wash away, leaving a stencil around it. This process enabled the artist to incorporate their hand into the process, to stay true to their drawing.



A macro photo of a screenprint with a photographically produced stencil. The ink will be printed where the stencil does not cover the substrate.

A method that has increased in popularity over the past 70 years and is tremendously popular is the photo emulsion technique:

1. The original image is created on a transparent overlay. The image may be drawn or painted directly on the overlay, photocopied, or printed with a laser printer, as long as the areas to be inked are opaque. A black-and-white negative may also be used (projected on to the screen). However, unlike traditional platemaking, these screens are normally exposed by using film positives.
2. The overlay is placed over the emulsion-coated screen, and then exposed with an ultraviolet light source in the 350-420 Nanometer spectrum. Other light sources do not work well. The UV light passes through the clear areas and create a polymerization (hardening) of the emulsion.
3. The screen is washed off thoroughly. The areas of emulsion that were not

### Foil

is what you would imagine. A glue is printed onto the fabric and then foil is applied for a mirror finish.

### Glitter/Shimmer

silver flakes are suspended in a plastisol ink to create this sparkle effect. Usually available in gold or silver but can be mixed to make most colours.

### Metallic

similar to glitter, but smaller particles suspended in the ink. A glue is printed onto the fabric then a nanoscale fibers applied on it.

### Expanding ink (puff)

an additive to plastisol inks which raises the print off the garment, creating a 3D feel.

### Caviar beads

again a glue is printed in the shape of the design, to which small plastic beads are then applied – works well with solid block areas creating an interesting tactile surface.

### Four colour process

artwork is created using dots (CMYK) which combine to create the full spectrum of colours needed for photographic prints – this means a large number of colours can be printed using only 4 screens, making the set-up costs viable. The inks are required to blend and are more translucent, meaning a compromise with vibrancy of colour.

### Gloss

a clear base laid over plastisol inks to create a shiny finish.

### Nylobond

a special ink additive for printing onto technical or waterproof fabrics.

### Mirrored silver

Another solvent based ink but you can almost see your face in it.

## Versatility

Screenprinting is more versatile than traditional lithography, and it does not have to be planar. So to work with a variety of materials, such as textile, glass, metal, and plastic. As a result, screen printing industries, from clothing to product labels to circuit boards.

## External links

<http://www.pneac.org/printprocesses/screen/>

<http://www.sonofagun.com>

<http://www.fespa.com/> - The Federation of European Screenprinting Associations

<http://www.sgia.com/> SGIA - Specialty Graphic Industries Association

## Notes

- <sup>a</sup> <sup>b</sup> Printer's National Environmental Assistance Center Official website (<http://www.pneac.org/printprocesses/screen/>). Retrieved on 2007-09-15.
- <sup>a</sup> [http://www.signindustry.com/screen/articles/2005-01-15-BS\\_ReclaimingScreens2.php3](http://www.signindustry.com/screen/articles/2005-01-15-BS_ReclaimingScreens2.php3)

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Categories: DIY culture | Printmaking



An example of STENCILING, not screen printing used on Woodblock printing.

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